

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION FOR PATENT

ON

INTELLIGENT DHCP

BY

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INTELLIGENT DHCP

FIELD OF THE INVENTION

The present invention relates generally to the assignment of addresses for hosts on a local area network and more specifically to a method of determining a type of address dependent upon a desired operational features of a host.

BACKGROUND OF THE INVENTION

Office and home local area networks are becoming extremely popular. Local networks may provide a system for sharing available resources and transferring data among devices within the network. An example of a protocol for local networks is the Dynamic Host Configuration Protocol (DHCP). An advantage of utilizing DHCP is the ability of a DHCP server to automatically assign each host on a local area network its Internet Protocol (IP) address. A DHCP server can dynamically assign an IP address to each host within a network. Assignment of IP addresses allows easier use by consumers because it does not require any user interaction of manually assigning IP addresses to each host within the network.

However, several advanced consumer features require that a user identify a specific host and utilize a static IP address. For example, designation of a demilitarized zone (DMZ) host may require a fixed IP address. It is difficult for consumers, especially users of a home network, to determine whether a specific feature requires a static IP address.

Consequently, it would be advantageous if a system and method existed which assigned appropriate IP addresses depending upon the capabilities the user desired on his or her home network. It would also be advantageous if a system and method existed which could provide a list of hosts and the features of each host to a user and could allow the user to select the features in which the user desired in his or her local network. Based upon the user's selections, a static IP address could be assigned to the host if required.

SUMMARY OF THE INVENTION

Accordingly, the present invention is directed to a system and method of assigning appropriate IP addresses to hosts of a local network depending upon the user's desired features present within the network. A list of hosts within a network may be generated along with possible features provided by each host within the network. A user

may be capable of selecting a specific feature to be performed by a specific host of the local network. The system and method of the present invention may assign a static IP address to the host if the desired feature requires a static IP address. If the specified feature requiring the static IP address is subsequently disabled, then the static IP address may be returned to the pool of available IP addresses and the DHCP server may assign an IP address to that host in a usual manner.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory only and are not restrictive of the invention as claimed. The accompanying drawings, which are incorporated in and constitute a part of the specification, illustrate an embodiment of the invention and together with the general description, serve to explain the principles of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The numerous advantages of the present invention may be better understood by those skilled in the art by reference to the accompanying figures in which:

FIG. 1 depicts an exemplary embodiment of a local area network of the present invention;

FIG. 2 depicts an exemplary embodiment of a process in accordance with the present invention;

FIG. 3 depicts an exemplary embodiment of a graphical user interface of the present invention; and

FIG. 4 is a block diagram of an information handling system of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

Reference will now be made to a presently preferred embodiment of the invention, an example of which is illustrated in the accompanying drawings.

Referring to FIG. 1, an exemplary embodiment of a local area network 100 is shown. Network 100 may utilize the Dynamic Host Configuration Protocol (DHCP) which may allow network 100 to assign a temporary Internet protocol (IP) address to a host automatically when the host connects to the network. Network 100 may include a group of personal computers, information appliances, network devices and the like that are interconnected to allow sharing of resources and transfer of data.

As shown in the embodiment of FIG. 1, network 100 may include a DHCP server 110 and four computers 120-150, for example. Each computer 120-150 may be capable of accessing a world wide network 160 through the DHCP server 110. An example of a world wide network 160 is the Internet.

5 An advantageous aspect of DHCP is the ability to automatically assign an IP address to each host connected to the network, thus user interaction is not required. If the user desires an advanced consumer feature for the network 100, then a static IP address may be required. An advantage of the present invention is the ability for the user to select the desired features he or she wishes for his or her network. Based upon the
10 desired features, the system of the present invention may determine if a static IP address is required for the host and assign a static IP address if the feature requires a static IP address.

Referring now to FIG. 2, an exemplary embodiment of a process 200 in accordance with the present invention is shown. An advantageous aspect of an
15 embodiment of the present is the ability to provide static IP addresses to hosts when features desired by a consumer require static IP addresses without user intervention. The process may begin by connecting a host to the network 210. Connection of a host may simply include plugging a device between a cable modem and a home local area network hub, for example. The network may be capable of detecting the presence of an additional
20 host present within the local network 220.

A list of available features associated with each of the hosts connected to the network may be provided 230. For example, a list of available features may include blocking Internet access to the host and designating the host as the demilitarized zone (DMZ) host. If the consumer desires any one or more of these features, he or she may
25 activate them. Activation of the features relating to a host may be accomplished by clicking a button next to the feature. In an alternative embodiment of the invention, a desired feature may be activated automatically when the host is connected to a network. If the desired feature requires a static IP address, the present invention may be capable of detecting the necessity of a static IP address and may assign a static IP address.

30 The method and system of the present invention may be capable of determining whether a user's desired features require a static IP address 240. For example, a

consumer may activate the feature of blocking Internet access to a host. The system and method of the present invention may be capable of realizing that the blockage of Internet access is desired, and, that this requires a static IP address. As a result, a static IP address may be assigned to the host to ensure blockage of Internet access to the host 250. While
 5 DHCP servers generally assign addresses dynamically, a static IP address may be assigned by ensuring that the same IP address is assigned to the host every time.

If a specified feature requiring a static IP address is subsequently disabled, the static IP address associated with the host may be returned to the pool of available IP addresses 260. The DHCP server may assign an IP address in a dynamic fashion when a
 10 host no longer requires a static IP address.

Referring now to FIG. 3, an embodiment of a graphical user interface 300 suitable for allowing a user to select the features present on a host of the present invention is shown. When a host is installed, the consumer may be capable of accessing a configuration web page. The web page may show the hosts which are connected to the
 15 local area network. For example, utilizing the embodiment of FIG. 1, four icons representing the four computers may be displayed.

If the icon representing a host is activated, a graphical user interface 300 may be displayed corresponding to the host that has been activated. In an embodiment of the invention, a list of available features 305 associated with the host 310 may be provided.
 20 If a user desires that host 310 act as a DMZ host, then the box associated with the feature 320 may be selected. When this is accomplished, the system and method of the present invention may be aware that host 310 is being designated as the DMZ host and that host 310 may require a static IP address to operate correctly.

Referring now to FIG. 4, a hardware system in accordance with the present invention is shown. The hardware system shown in FIG. 4 is generally representative of
 25 a preferred hardware architecture of an information handling system 400 of the present invention. Information handling system 400 may be in the form of a computer 120-150 and a DHCP server 160 of FIG. 1. Further, information handling system 400 may be capable of executing a program of instructions to assign static IP addresses to hosts if
 30 desired operational features of a host require a static IP address.

A controller, for example, a processing system 402, controls the information handling system 400. The processing system 402 includes a central processing unit such as a microprocessor or microcontroller for executing programs, performing data manipulations and controlling the tasks of the information handling system 400.

5 Communication with the processing system 402 may be implemented through a message or system bus 410 for transferring information among the devices of the information handling system 400. The system bus 410 may include a data channel for facilitating information transfer between storage and other peripheral devices of the information handling system 400. The system bus 410 further provides the set of signals required for
10 communication with processing system 402 including a data bus, address bus, and control bus. The system bus 410 may comprise any state of the art bus architecture according to promulgated standards, for example industry standard architecture (ISA), extended industry standard architecture (EISA), Micro Channel Architecture (MCA), peripheral device interconnect (PCI) local bus, standards promulgated by the Institute of Electrical
15 and Electronics Engineers (IEEE) including IEEE 488 general-purpose interface bus (GPIB), IEEE 696/S-600, and so on. Furthermore, the system bus 410 may be compliant with any promulgated industry standard. For example, the system bus 410 may be designed in compliance with any of the following bus architectures: Industry Standard Architecture (ISA), Extended Industry Standard Architecture (EISA), Micro Channel
20 Architecture, Peripheral Device Interconnect (PCI), Universal Serial Bus (USB), Access bus, IEEE P6394, Apple Desktop Bus (ADB), Concentration Highway Interface (CHI), Fire Wire, Geo Port, or Small Computer Systems Interface (SCSI), as examples.

Additionally, the information handling system 400 includes a memory 404. In one embodiment, memory 404 is provided on SIMMs (Single In-line Memory Modules),
25 while in another embodiment, memory 404 is provided on DIMMs (Dual In-line Memory Modules), each of which plugs into suitable sockets provided on a motherboard holding many of the other devices shown in FIG. 4. Memory 404 includes standard DRAM (Dynamic Random-Access Memory), EDO (Extended Data Out) DRAM, SDRAM (Synchronous DRAM), or other suitable memory technology. Memory 404 may also
30 include auxiliary memory to provide storage of instructions and data that are loaded into the memory 404 before execution. Auxiliary memory may include semiconductor based

memory such as read-only memory (ROM), programmable read-only memory (PROM) erasable programmable read-only memory (EPROM), electrically erasable read-only memory (EEPROM), or flash memory (block oriented memory similar to EEPROM).

The information handling system 400 may include a network connection device or a network interface 406. The network interface 406 communicates between the information handling system 400 and a remote device, such as external devices, networks, information sources, or host systems that administer a plurality of information appliances. For example, host systems such as a server or information handling system, may run software controlling the information handling system 400, serve as storage for an information handling system 400, or coordinate software running separately on each information handling system 400. The network interface 406 may provide or receive analog, digital, or radio frequency data. The network interface system 406 preferably implements industry promulgated architecture standards, including Recommended Standard 232 (RS-232) promulgated by the Electrical Industries Association, Infrared Data Association (IrDA) standards, Ethernet IEEE 802 standards (e.g., IEEE 802.3 for broadband and baseband networks, IEEE 802.3z for Gigabit Ethernet, IEEE 802.4 for token passing bus networks, IEEE 802.5 for token ring networks, IEEE 802.6 for metropolitan area networks, 802.66 for wireless networks, and so on), Fibre Channel, digital subscriber line (DSL), asymmetric digital subscriber line (ASDL), frame relay, asynchronous transfer mode (ATM), integrated digital services network (ISDN), personal communications services (PCS), transmission control protocol/Internet protocol (TCP/IP), serial line Internet protocol/point to point protocol (SLIP/PPP), and Universal Serial Bus (USB), as examples. For example, the network interface system 406 may comprise a network adapter, a serial port, parallel port, printer adapter, modem, universal asynchronous receiver-transmitter (UART) port, etc., or use various wireless technologies or links such as an infrared port, radio-frequency (RF) communications adapter, infrared transducers, or RF modem.

The information handling system 400 may preferably include a display system 412. This may allow for a generation of a display when an information handling system 400 is connected to a display device. The display system 412 may comprise a video display adapter having all of the devices for driving the display device, including video

random access memory (VRAM), buffer, and graphics engine as desired. A display device may comprise a liquid-crystal display (LCD), or may comprise alternative display technologies, such as a light-emitting diode (LED) display, gas or plasma display, or employ flat-screen technology.

5 An information handling system 400 may further include an input/output (I/O) system 416. This may allow for user input via I/O devices when I/O devices are connected to information handling system 400. Input/output system 416 may comprise one or more controllers or adapters for providing interface functions between one or more I/O devices. For example, input/output system 416 may comprise a serial port, parallel
10 port, network adapter, printer adapter, radio-frequency (RF) communications adapter, universal asynchronous receiver-transmitter (UART) port, etc., for interfacing between corresponding I/O devices such as a mouse, joystick, trackball, trackpad, trackstick, infrared transducers, printer, modem, RF modem, bar code reader, charge-coupled device (CCD) reader, scanner, compact disc (CD), compact disc read-only memory (CD-ROM),
15 digital versatile disc (DVD), video capture device, touch screen, stylus, electroacoustic transducer, microphone, speaker, etc. It should be appreciated that modification or reconfiguration of the information handling system 400 of FIG. 4 by a person of ordinary skill in the art would not depart from the scope or the spirit of the present invention.

Although the invention has been described with a certain degree of particularity, it
20 should be recognized that elements thereof may be altered by persons skilled in the art without departing from the spirit and scope of the invention. It is believed that the method and system for the present invention and many of its attendant advantages will be understood by the foregoing description, and it will be apparent that various changes may be made in the form, construction, and arrangement of the components thereof without
25 departing from the scope and spirit of the invention or without sacrificing all of its material advantages, the form herein before described being merely an explanatory embodiment thereof. It is the intention of the following claims to encompass and include such changes.